Plan Title:	**Data Access and Dissemination System**
Plan Number:	**CB-DR-97-02-N**
Plan ID:	**IT**

PART I - INFORMATION TECHNOLOGY ARCHITECTURE PLAN

1. Information Requirements

A. Introduction

> *"As part of its stepped-up effort to dramatically expand Americans' access to official demographic and economic information, the Commerce Department's Census Bureau today announced plans to expand electronic dissemination of its data. The Internet, along with other electronic delivery systems, will gradually become the primary sources for Census Bureau statistics."*
>
> *--Press Release, August 1995*

The Bureau of the Census (BOC) has been one of the pioneer federal agencies using the Internet to disseminate its data. In January 1994, the BOC Project DIAMOND team recommended the immediate implementation of an Internet System and later that year the Bureau's Internet site was established as part of the Administration's government reinvention program and was a recipient of Vice President Gore's "Hammer" award for improving government operations. On average, the Bureau is now receiving more than 90,000 inquiries per day from customers who access its Internet site.

The Data Access and Dissemination System (DADS) will be developed for several fundamental reasons with its primary focus being the provision of one general (electronic) system for all Census Bureau data access. Using the Internet for data access and dissemination responds to the Vice Presidents National Performance Review to deliver more census data faster, to do more, and to do it electronically. It also complies to the requirement of the Government Information Locator Service (GILS) to provide data electronically. Additionally, DADS can comply with directives, mandates, and standards for the Federal Geographic Data Committee (FGDC).

DADS, through the Internet, will gradually become the primary electronic source for BOC data and statistics. It would incorporate all that is successful on the Internet site and consolidate all the individual efforts to build an assortment of integrated tools to meet the needs of our

customers. In concept, DADS would provide faster access, be flexible enough to allow customization of data products, and be cost-efficient.

A critical point to make at this time is that DADS is merely a concept; a research and development process aimed at satisfying stated goals. Plans are that it will provide both *internal* and *external* customers controlled access to all census data currently made available through electronic means. DADS would only supplement what data and data products are currently available, not replace them.

B. Background

There are three efforts related to the Census Bureau's electronic data access and dissemination plans: DADS Technical Development, DADS User Requirements, and Internet Support. Access to a Census Bureau supported Internet site exists now and has proven to be tremendously successful. DADS planning incorporates all that is successful with this census data delivery tool and expects to greatly extend those capabilities.

Staff for DADS is funded both by DADS and CASIC. The CASIC involvement will ensure that the research and reinvention efforts are reflective of external and Bureau-wide internal user requirements. Staff for Internet is funded by the Information Technology Directorate.

This Program Development Plan (PDP), in general, involves acquiring equipment and software to support the DADS concept, primarily the enhancement of current data dissemination and tabulation/manipulation techniques. In particular, the implementation, extension, and improvement of current automation techniques is stressed.

DADS will provide internal and external customers access to three types of information: pre-specified data summaries; public-use microdata sets and related software tools; and customized data extractions and tabulations, either generated by DADS on-demand, or minimally, provide the ability to initiate a request. These data will be essentially a “read only” environment with data users utilizing base data sets as the source for the creation of customized tabulations and extracts. The focus will be on the 2000 Decennial Census and Continuous Measurement data sets, but with the ability to accommodate other data sets having geographic detail, like those produced in the Bureau's Economic and Demographic Programs.

Since DADS has identified a number of current operations for automation, efforts are being taken to minimize the variety of hardware and software solutions needed and to remain in step with the Bureau’s corporate philosophy of open systems concepts and designs. By fostering an environment that will define the framework for all dissemination of routine and ad hoc census statistical efforts, we will explore the feasibility of using standard hardware and software across most, if not all, applications. In taking this direction, we expect to significantly improve homogeneity and consistency among similar and related data products, especially in the area of customized data extractions and tabulations and in public and private sector response capability.

DADS TECHNICAL DEVELOPMENT TEAM

The DADS Technical Team serves as the Program Management for DADS. Its goal is to conduct technical research and development for DADS. It will procure technical support, hardware, and software for development of DADS. This team will design and develop DADS prototypes based on user requirements and R&D efforts. It will also implement modifications to DADS that are based on results from testing iterative prototypes. The final DADS prototype system has a target delivery date coinciding with that of the FY 1998 Decennial Dress Rehearsal.

DADS USER REQUIREMENTS TEAM

The DADS User Requirements Team will facilitate the identification of user functional requirements for DADS and support the identification of technical requirements. They will facilitate all DADS "outreach & promotion" activities, such as DADS presentations, seminars, and the development of the business case, policy papers, and a "white paper." The Team also facilitates the planning and monitoring of testing the iterative DADS prototypes as they become available.

INTERNET

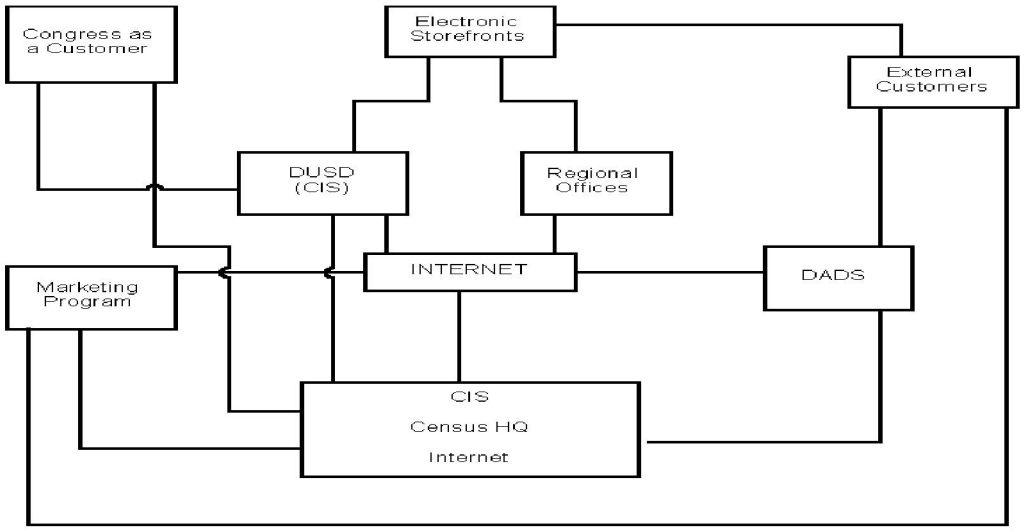
The Internet Support Team manages, coordinates, and maintains the Census Bureau's Internet systems' hardware and software. It develops systems applications software for Internet and resolves technical problems with the Internet systems. The team also assigns and maintains Internet passwords and develops and provides generalized Internet user training and information.

This major project is a result of:

- The issuance of Vice President Gore's National Performance Review item on the expansion of the electronic availability of census data.
- The issuance of President Clinton's Executive Order on Customer Service Standards.
- The wide-spread acceptance by the public and private sectors of the Internet as a data access and dissemination tool.

This project's primary focus is the presentation of a coordinated and cost-effective strategy for disseminating census data. All information available to customers of the Census Bureau will eventually be available via the Internet and will consist of six general classes of information; i.e., microdata, aggregated data, organizational data, publications and analysis, software products and custom software applications.

INTERNET Interconnections
and Related Programs



2. Planned Processing and Telecommunications Architecture

A. Current Architecture.

INTERNET

The Bureau's Internet System is designed around an integrated network of UNIX workstations, personal computers, and servers connected to the "*outer*" Internet network. The "*outer*" Internet network is connected to the Census Bureau's internal LAN by a network router, or "*firewall*", that blocks any unauthorized network traffic from reaching the Bureau's internal LAN thereby protecting our sensitive assets. Each subsystem in this network has its own independent UNIX operating system, communication suite (TCP/IP) that allows the system to function and communicate with other internal and external computer systems, language compiler software to support the installation of applications, and statistical software to support micro data distribution. Public domain software, supported by the international Internet user community, is made generally available. This public domain Internet software enables the system to operate as an independent Internet node complete with Hyper Text Markup Language (HTML) and Graphical User Interface (GUI) capability.

Hardware: The Bureau's Internet System consists primarily of a collection of large UNIX workstations. Planned procurements include a robotic tape cartridge backup system as well as

additional UNIX workstations. Disk space is the primary limiting factor with processing power a close secondary concern. Both of these are expected to become increasingly critical considerations as the number of users and requests for data products increase.

Software: Software limitations are minimal. The majority of the utilized software is public domain and readily available as downloads from the Internet. The expected increase in Internet usage and the expected provision of further data dissemination and tabulation capability will require further capital investments in software (e.g., SAS).

Functionality: The Bureau's Internet System supports two main functions. The primary function is to make Census Bureau data available to the Internet community at large. The secondary function is to provide support to Census Bureau staff in the utilization of the Internet, just like any other Internet user for mail, file transfers, accessing information published by other government agencies, educational institutions, businesses, and private citizens.

DADS

The DADS is currently a research and development project and therefore has no designated architecture in place. The DADS Technical Team plans to design and implement an initial prototype architecture by the first quarter of FY 1997. The definition of this prototype, as well as its functional and technical requirements, will be based on the results and findings from the DADS User Requirements Team. The DADS efforts are guided by the key goals, objectives, and action plans that are identified by the Bureau's Strategic Planning Process.

The Telecommunications Architecture supporting Census Bureau, Internet, and DADS operations is represented by Telecommunications portion of the Central Resources Management PDP CB-IT-94-01-E. Both the LAN and WAN are managed by the Census Bureau's Telecommunications Office and therefore related telecommunications costs will not be addressed in the PDP.

B. Alternatives

INTERNET AND DADS

As with any proposed technical replacement/refreshment process, the continuation of current implementations, i.e. the maintenance of the status quo, is commonly considered the initial alternative. Since investigations into the shortcomings of this alternative are what is providing the impetus for this project, we will reject the concept of maintaining the current technical environment as a feasible alternative.

A second alternative discussed involved the purchase and implementation of the components of the general concept by contract, or outsourcing. Since the corporate knowledge base was currently deemed sufficient to accommodate the needs of the Bureau, this alternative was rejected due to the obvious duplication of effort in the areas of hardware, support, and desired products.

INTERNET

The third alternative, as discussed, was to create a common system to support the corporate environment. The Bureau of the Census Internet System is a technological response designed to comply with mandates from the NPR, GILS, and FGDC, as well as having direct link(s) to the Census Bureau's strategic planning efforts.

DADS

The third alternative discussed was accepted. The DADS is a conceptual project driving a research and development effort. A design and implementation team is in the process of developing the DADS concept into a complete proposal defining the main features of the system. This process will generate a multitude of alternatives which will be evaluated on their independent merits as they are developed.

The design and implementation team will enlist the assistance of internal and external users to test the viability of each developed alternative and accept, reject, and/or refine it as necessary. The team will identify and, as appropriate, use all relevant Bureau work underway or planned so that a coordinated corporate approach to data access and dissemination is universally utilized.

C. Proposed Architecture

INTERNET

The Bureau's current Internet System is comprised of UNIX-based Sun Workstations and personal computers integrated into centrally supported LAN/WAN. As the Internet system is upgraded and enhanced through the implementation of expanded disk storage and processing capability, its goals are to meet three additional functional requirements in order to reflect a system configuration that can meet immediate Census Bureau Internet site needs and be scalable enough to easily meet expanding future needs. These are as follows:

1. There should be either two redundant systems or one highly fault-tolerant system. Multiple systems, as exist now, have proven to be very complex to maintain and expensive to manage. Two large systems or one very large, highly fault tolerant, system is required to maintain a high level of availability. Many small systems quickly become difficult to integrate and manage and *it is anticipated that the shortage of government staff with the proper technical and management skills will continue to get worse for the foreseeable future.*

2. The system(s) should be scalable to rapidly meet new load requirements without having to add additional systems. This means the systems should be able to add large amounts of disk storage, memory, and additional processors without having to add additional computers. By limiting the number of operating systems, intersystem communications delays are

minimized, optimal file request response times will be maximized, and single point of failure concerns will be lessened. Additionally, implementation of this approach will minimize system management overheads and technical expertise requirements which, by default, will reduce operating costs and improve service to the customer.

3. The system should have a high level of throughput. As the number of files and the size of files being served grows, the file serving (information pumping) requirements on the hardware will increase exponentially. Larger machines designed specifically for serving information far outperform many smaller machines not designed for data serving.

DADS

Since the DADS is a concept at this point in time and the architecture for the project is not stable, the principles that will guide the development of the system architecture as it is developed are as follows:

1. The system will provide direct access to a limited number of data summaries, to public use microdata samples, and to a process for specifying special tabulations from confidential files. It will be accessible to the widest possible array of users through the Internet and available intermediaries, including State Data Centers and similar groups, libraries,, universities, private firms, and so forth. Internal access through open systems is assumed.

2. There will be limited standard, prepackaged data summaries, and no standard printed reports except those few profile reports necessary to show appreciation to the public for cooperation. All access and special product preparation will be through the dissemination system. All reports, files, etc. will be prepared on demand and rapidly, even with high demand.

3. Disclosure protection will be built into the system and base files so that individual products from the system do not require review for disclosure. This implies that a confidentiality edit is performed on the basic file to minimize or eliminate additional confidentiality reviews.

4. All data sources with comparable levels of geographic detail will eventually be integrated into the system (e.g., economic census files, decennial census files, population estimates files.)

5. Geography is the integrating principle for the data, using both standard geographic areas and nonstandard geography based on centroids or coordinates, as appropriate.

6. Metadata, including item definitions, descriptions of edits and imputations, and pointers to related items in other data sets in the system, will be available integrally with the data.

Estimates of sampling error/uncertainty or the ability to calculate such estimates will be provided within the data sets.

7. The system and its use will save money compared to the traditional publication program so that resources can be dedicated to educating users and potential users on how to access and use the system to get the products they need.

8. Most transactions will include a fee for service--for file extracts, for printed summaries, for CD-ROM summaries, for graphical summaries, and so forth.

9. Development of the dissemination system is linked with planning for decennial census and continuous measurement processing.

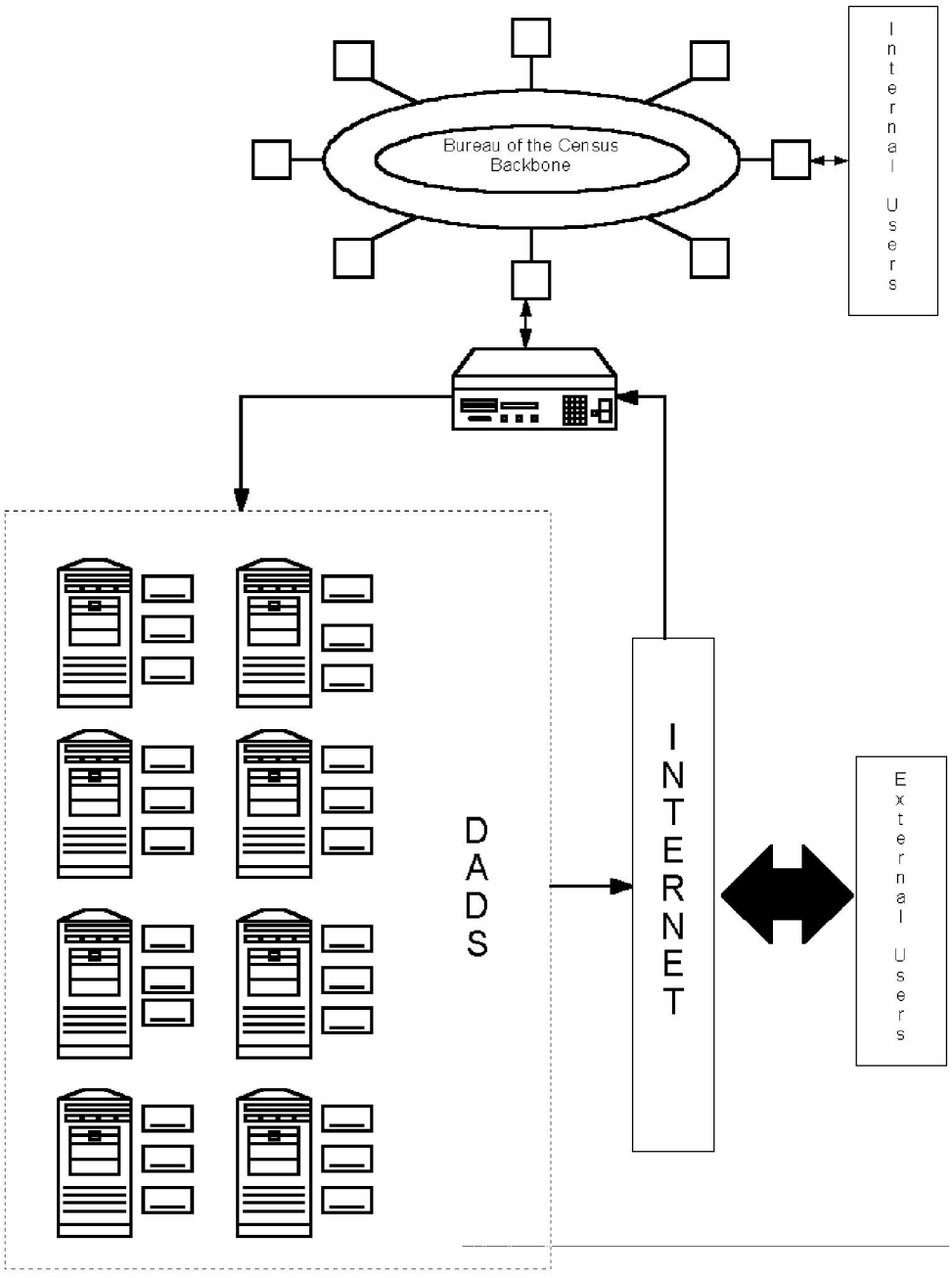
10. Development of ideas and plans will make use of the work already done or underway as part of CENSAS, DAPS90, the 1990 census DPSS, the Internet efforts, the reinvention lab on post-collection processing, continuous measurement, the CPS data access system, the Governments Division work, SIPP On-Call, the Population Division data dissemination system, and so forth.

11. Both internal and external experts will participate in defining and developing this system.

A contractor will work with Census Bureau staff designing, developing, and deploying a data access and dissemination prototype. This prototype will focus on easy access, manipulation, retrieval, and tabulation of detail decennial census data operating in a high-performance distributed client/server environment. The contractor will provide expert technical advise in conducting research applicable to the design and development of the prototype. This research will include but not be limited to evolving leading-edge technologies pertaining to access and manipulation of very large-scale distributed data bases across multiple hardware and software platforms.

The contractor will work closely with Census Bureau staff in a team environment providing expert advise as well as training translating DADS project needs and requirements into practical, technology driven solutions. The contractor will be a vital link between the Census Bureau and Oracle Corporation bringing Oracle's technological advances into the realm of the DADS project. The contractor will develop the data base engine using Oracle 7 tools and related products.

Throughout the development phase of this system, the contractor will keep Census Bureau staff informed regarding all aspects system development, particularly regarding interpretation of specifications, testing of the prototype through its various stages, etc. The test production phase of the DADS prototype must include all necessary enhancements and corrections identified during the testing phases. Census Bureau technical personnel will approve each phase as the projects are developed and before subsequent phases are commenced.



D. Benefits

INTERNET

The objectives of the Bureau of the Census Internet System were the implementation of a process capable of efficiently disseminating Census Bureau information in a consistent manner via the Internet and to define the policies governing the operational process. These have been accomplished and the following benefits realized:

- Broader, consistent, and more timely dissemination of Census Bureau information.
- Increased responses for Census Bureau collection efforts as a result of users/customers becoming more familiar with Census Bureau products and their inherent value.
- Provide better user interaction, service, and response times.
- Improved ability to obtain marketing information about Census Bureau products.
- The ability/opportunity to effectively advertise and increase public awareness about Census Bureau products and services.

DADS

The DADS will implement a easy-to-use general electronic system for quick and easy access to Census Bureau Data. This system will foster a coordinated corporate approach to data access and dissemination throughout the Census Bureau by:

- providing timely data while being innovative and extremely customer-responsive.
- being designed to be customer and market-driven to provide products and services of superior value to the Bureau's customer and user community.
- exemplifying the goal(s) to adopt the most efficient and innovative processes to improve cost, cycle time, and quality performance in support of core business activities.
- incorporating all that is deemed successful from the Bureau's Internet System and consolidate all of the individual Bureau efforts to build an assortment of integrated tools, with a common interface, to meet the needs of the Bureau's customers.

E. Performance Measures

INTERNET & DADS

Bureau users and customers want the ability to define exactly what they need, when they need it, and in the format they specify.

In the past, information such as microdata, aggregated data, organizational data, publications and analysis, software products, and custom software applications were made available to our customers through a variety of dated mechanisms such as paper copy, mail, floppy disk, tape, and direct download over modem technology. The most frequently cited complaint was our inability to provide timely data products in flexible, easy-to-use, and cost-efficient formats.

In the days before the Internet and DADS, Census Bureau analysts have had restricted or, at best, less access to the very data sets they specify during the product development process. The

product specification process is the most expensive component of the data dissemination process because of the time it takes for analysts to anticipate what summary-level data tables will meet most users needs. Thus, analysts are building expensive, *one-size-fits-all* products; not necessarily what the Bureau's customers want or need. Additionally, once the product is "on-the-streets," it is/was difficult to provide effective, efficient customer service when the analyst does not have access to the very data or information driving the customer's inquiry.

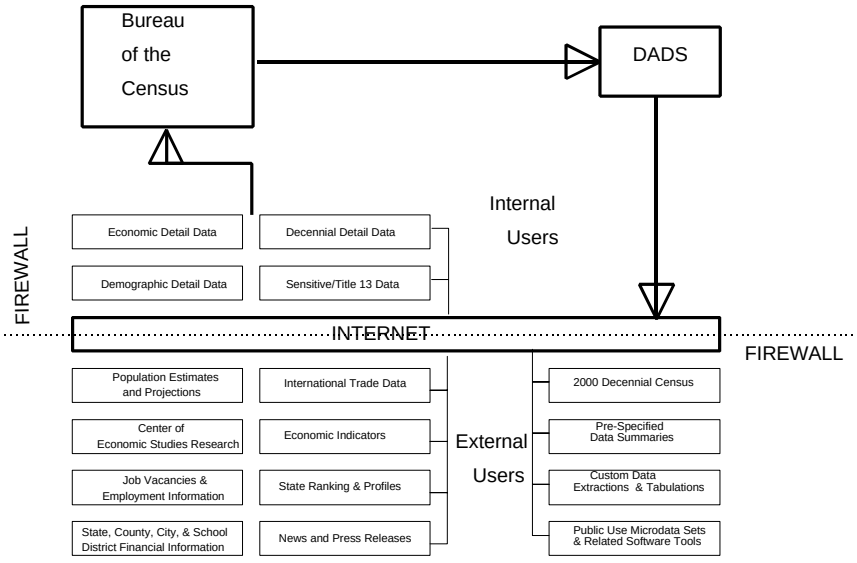
Now all classes of information mentioned above, and a host of others, are available to customers of the Census Bureau via the Internet/DADS. This utilization of commonly accepted technology has not only demonstrated our commitment to be responsive to our customer's wants/needs but dramatically re-energized confidence in the Bureau of the Census.

3. Security

INTERNET/DADS

Security plans and procedures to ensure privacy and security for existing systems are currently in effect and will apply to any new equipment and/or processes. A security plan for Internet (CEN186) is on file with the Census Bureau's ADP Security Office. A security plan for DADS will be filed when final design and function parameters are in place.

4. Data Access and Dissemination System/Internet Information/Data Flow



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PART II - ANNUAL PLAN

1. Architecture Status

INTERNET/DADS

Because systems age with technological change as well as time, we fully expect to encounter technical, functional, and maintenance obsolescence points over the life of this architectural decision. However, we fully expect this architecture to meet our needs for the life of this document with the following caveats:

1. All DADS requirements and figures for FY 1997 and FY 1998 are estimates and subject to change. DADS is a research and development effort.

2. No requirements and figures can be estimated beyond FY 1998 because the iterative prototyping for DADS is scheduled to be completed by then. The test results, along with the Internet system as a delivery tool, will become the basis for the production DADS system.

2. IT Objectives

The IT objectives for fiscal year 1997 are several and generally involve the extension, improvement, or implementation of current automation techniques. We will investigate both mature and leading-edge technologies which have the demonstrated potential for achieving substantial cost savings and productivity gains and which can easily be integrated into our existing and/or planned environment. We plan to explore the feasibility of using standard hardware, software, and LAN resources across most, if not all, applications.

INTERNET

At a macro level, we intend to address future efforts toward the development of a strategy based on a Bureau-wide approach. More effort will be placed into the evaluation of time frames, costs, alternative means of distribution for customers lacking Internet access, and maintenance of the

information. The primary focus will be the fostering of greater cooperation between offices to preclude duplication of effort and to ensure a degree of commonality, i.e., “look and feel”, between all Bureau Internet systems.

At a micro level, our primary objectives for the Bureau's Internet site are:

- to base the current system on one highly fault-tolerant system or to use two very large redundant systems in order to maintain a high level of availability.
- to design the system to be scalable in order to rapidly meet new load requirements without having to add additional equipment. This requires that the system be able to incorporate large disk storage devices, memory, and additional processors without having to add additional computers.
- to design a system with a high level of throughput to handle information-pumping requirements that are projected to increase exponentially.

DADS

The DADS will recognize the following goals by engaging and soliciting customers to participate directly in the design of the system to:

- provide faster access by internal and external customers to Census Bureau data
- provide a flexible system that will allow customization of data extractions and tabulations
- realize cost savings by eliminating or minimizing pre-specified printed reports.

IT-related goals for DADS are to design and develop configurations best suitable to access, manipulate, tabulate, and manage large volumes of data quickly, easily, and cost-effectively.

For example, an objective is to store detailed data, such as that from a decennial census, across multiple machines, each representing an individual state, in a distributed environment that is transparent to the user. Another objective is to allow direct reads of data from memory and not disk, such as using Oracle's capability of locking pages of memory. DADS also plans to incorporate high-performance networks (e.g., FDDI, HDDI), CASE tools, a spatial data engine, and an Intelligent Query server.

3. Status

A. Accomplishments/Progress

INTERNET

An active Internet site is in place and operational at this time. This site offers a variety of Census Bureau data and data products. On average, the Bureau is now receiving more than 90,000 inquiries per day from customers who access its Internet site.

DADS

Internal Census Bureau Roundtables that Provide Guidance to the DADS Process: Three one-day roundtable discussions were held to provide initial guidance to the DADS Working Group. Results from the discussions provided input to user requirements, technical requirements, and policy issues.

The cross-directorate representatives on the roundtables were assembled for two main purposes:

- To lay the foundation for a communication process that would encourage Bureau-wide participation in the design and development of DADS
- To facilitate an initial study of the vision and principles, listed in the section above, under which the system will be designed and developed.

The three roundtable discussions successfully engaged key Census Bureau staff who voiced very strong support for DADS. There was broad consensus across all three roundtable discussions that the process to move DADS from a concept to a reality involves a parallel track to: (1) engage and solicit customers directly in designing the system, and (2) lay the groundwork for resolving technical and policy issues that can be barriers to the success of DADS.

In short, there was consensus among all three roundtable discussions that the Bureau's data access and dissemination system processes need to be revamped. That is, no longer is it "business as usual." Serious budget restrictions also direct us to do something that is more cost-efficient, yet faster and flexible for customers. New technology affords us unanticipated opportunities to reduce time between data collection and dissemination without reducing quality or increasing costs. Fortunately, many of the key people involved in these roundtable discussions expressed interest in exploring these avenues, as well as being involved in the implementation of the DADS project.

Focus Groups with Census Bureau Customers: To carry out the “roundtable” recommendation to engage customers in the design of the system, a DADS Working Group facilitated twelve focus groups, attended by external and internal data users representative of a cross-section of our customer base. The External Focus Groups included representatives from: State Data Centers and Census Information Centers; state, local, and tribal governments; Federal agencies and Congress; business and economic organizations; racial/ethnic minority and rural groups; the Press; researchers and academicians; and librarians. The internal focus groups included representatives from most divisions within the Census Bureau.

A standard set of 25 questions, defined by the “roundtables,” were asked of each group. The questions were grouped under initial topics, such as product types and output media, geography,

confidentiality, cost, and user access. Individual responses from focus group members were documented.

Using the list of responses, the Working Group developed external and internal frequency matrices for all responses to each question to help identify common and unique needs and themes. The group then summarized the responses so that there was one external and one internal customer response to each question. Lastly, these internal and external summaries were compared and combined into one summarized answer to each question. This final summary did not delete any needs from either customer group; instead, it combined similar requirements and indicated if any requirements were unique to one group only.

High-Level Customer Requirements Summary: An analysis by the DADS Working Group of the detailed and summarized responses to the questions posed during the Focus Group sessions revealed that there are basically three product processes that DADS should support. These are:

- predefined products/services
- simple user-defined products
- complex user-defined products

In addition, to meet these requirements, DADS must be supported by a successful and detailed geographic infrastructure. Users also identified several basic DADS requirements, including:

- DADS should be simple and intuitive to use.
- DADS should support print-on-demand.
- DADS should provide on-line help and on-line training.
- DADS should notify users about the size, cost, and time it will take to receive requested product, prior to transmission.

DADS Prototype Definition: Next, the DADS Working Group met to formulate a prototype definition of DADS that can be used by the technical team to develop the first prototype, acknowledging that the prototype development would be an iterative process and that there would be several phases of prototype development.

The process used for developing this definition was to define the products and services, representative of various areas, that should be made available through DADS. The specified areas included Decennial, Economic, Geography, Demographic, International and Others.

Functional Requirements for DADS Prototype: As a result of all the research and analysis mentioned previously, the DADS Working Group was able to define customer requirements. That is, the Working Group surveyed customer satisfaction. The Technical DADS Team now must evaluate the ease of implementation. The result will be a list of functional requirements of the first DADS prototype.

DADS Policy Issues: Some policy issues were identified at the onset of the DADS process by the "roundtables" but as we moved further along in the requirements and definition of the system, others were added. These issues are as follows:

- Should the Bureau provide access to non-Census Bureau data, including data collected by the Bureau but published by other agencies?
- Standards.
- Determine/examine the "pre-defined" product processes.
- Are we competing with the private sector if we provide data users the ability to create "user-friendly" geography?
- Make the Agriculture Census geography at the county level consistent with the current level.
- Archiving and preservation of data.
- Revisit the confidentiality/disclosure policy. We need to examine the confidentiality (perception) vis-a-vis DADS to identify the full range/platter of policy issues.
- Examine the role of intermediaries and cost revenue sharing.
- Do we provide priority for certain classes of customers?

The DADS Working Group plans to address many of these issues by writing Policy Issues Papers. It is hoped that these "papers" will be instrumental at getting policy issues resolved.

Next Steps for User Requirements: Over the next several months, the DADS Working Group will:

- get "buy in" for the prototype definition from the key stakeholders
- draft a set of detailed functional requirements
- draft an initial set of technical requirements
- write policy papers
- write a Business Case for DADS
- develop an outreach and promotion plan, including a "white" paper

Technical Development of DADS: The technical "roundtable" that met in May and June 1995 agreed that after we determine what customers want, we must identify the technical resources required to design, implement, test, and maintain the system.

Here are some Fiscal Year 1996 Key DADS assumptions that can be made today regarding the identification of technical resources for the development of the prototype(s):

- The in-house technical expertise (with a few exceptions) does not exist or will not be made available for this project in FY 1996.
- The Census Bureau will contract-out for technical expertise to assist (and consult with) DADS staff in developing the prototype.

- The prototype (first phase or first iteration) will minimally deliver, in September 1996, internal user access and tab tools for 1990 census detail file and yet to-be-specified external users system functionalities.

B. Current Plans

For FY 1996 the DADS office will conduct research and development work in order to provide a "proof of concept" for the basic design, technology, and functionality of the DADS system. DADS will deliver prototypes to access, manipulate, and tabulate Census Bureau data focusing primarily on:

- 1990 Decennial Data
- Economic Data
- Summary Data

The prototypes will be scoped to support 50 beta testers and will be used to provide users a way to gain "hands-on" experience in order for them to provide user-feedback for input into building the actual DADS system. These prototypes will also serve to evaluate hardware and software suitable to access, manipulate, tabulate, and manage very large volumes of data quickly, easily, and in a cost-effective manner.

For FY 1997 a second prototype will be developed. The objective will be to learn from the initial prototype in terms of ascertaining a viable and scalable technical architecture, performance tuning, design of a user-friendly interface, etc. The second prototype will use a technical architecture which is scalable for the year 2001 production system. It will add functional and data support for the 1997 Economic and Agricultural Census, and the American Community Survey. The beta test of the second prototype will enhance functionality and user friendliness while also supporting an increased number of users.

For FY 1998 a third prototype will be developed. All feedback from the 1997 prototype will be incorporated into this effort. The primary objective, at this point in time, is to fully support the 1998 Decennial Dress Rehearsal while maintaining support for other data sets and usages.

By the first quarter of 2001, a fully functional production system is envisioned. This DADS will support production use of the 2000 Decennial Census, current economic, agricultural, and American Community Survey datasets and possibly more.

Currently, the DADS staff is evaluating hardware (see below in C. Acquisition Schedule) from a number of manufacturers of large UNIX-based systems. Software (see below in C. Acquisition Schedule) under evaluation is from Oracle, SYBASE, and SAS.

C. Acquisition Schedule.

1996

Replacement Hardware:
- *[2] Large UNIX Servers*
- *[8] UNIX Workstations*

High Performance Network Technology:
- *FDDI/HDDI*
- *Appropriate Network Cards*
- *Fiber Optic (FDDI) Switch(s)*
- *Software for DCE Development*

Contract Maintenance:
- *Hardware for UNIX servers and workstations*
- *Software for all acquired packages*

Data Base Products:
- *[6] users, CASE Tools for Oracle*
- *Spatial Data Engine Server (SDE)*
- *Intelligent Query Server*
- *DCE for Distributed Processing*
- *3rd Part Software, i.e., XBT, Visual Basic, Visual C, PowerBuilder, etc.*

1997

Replacement Hardware:
- *[4] Large UNIX Servers*
- *[12] UNIX Workstations*

High Performance Network Technology:
- *FDDI/HDDI/HIPPI/ATM*
- *Appropriate Network Cards*
- *Fiber Optic (FDDI) switch(s), concentrator(s), and router(s)*
- *Software for LAN Management*

Contract Maintenance:
- *Hardware for UNIX servers and workstations*
- *Software for all acquired packages*

Software Products:
- *Oracle 7.x*
- *Mapping S/W*
- *Front-end Application S/W*

1998

Replacement Hardware:
- *[6] Large UNIX Servers*
- *[16] UNIX Workstations*

High Performance Network Technology:
- *FDDI/HDDI/HIPPI/ATM*
- *Appropriate Network Cards*
- *Fiber Optic (FDDI) switch(s), concentrator(s), and router(s)*
- *Software for LAN Management*

Contract Maintenance:
- *Hardware for UNIX servers and workstations*
- *Software for all acquired packages*

Software Products:
- *Oracle 7.x*
- *Mapping S/W*
- *Front-end Application S/W*

4. Implementation Schedule

INTERNET		
ACTIVITIES AND MILESTONES:	*START*	*FINISH*
Support Census Bureau Internet Site	*10/01/96*	*ongoing*

DADS USER REQUIREMENTS		
ACTIVITIES AND MILESTONES:	*START*	*FINISH*
1. Identify User Requirements	*05/95*	*ongoing*
Customer Summaries (Focus Groups)	*05/95*	*12/95*
Functional Requirements	*10/95*	*04/96*
Phase 1 Prototype Definition	*10/95*	*02/96*
Technical Requirements	*03/96*	*04/96*
Business Case	*03/96*	*06/96*
Outreach & Promotion Plan	*03/96*	*06/96*
Policy Issues Papers	*03/96*	*06/96*
2. Respond to Policy Issues	*03/96*	*on-going*
3. Implement Outreach & Promotion	*03/96*	*09/96*
4. Implement Market Analysis Contract	*05/96*	*09/96*
5. User Conference (Beta-test workshop)	*09/96*	*12/96*

DATA ACCESS & DISSEMINATION SYSTEM		
ACTIVITIES AND MILESTONES for PHASE #1 PROTOTYPE:	*START*	*FINISH*
1. Project Management & Support	*10/96*	*ongoing*
1.1 Hire BOC Technical Staff	*03/96*	*09/96*
Database Systems Programmer (2)	*03/96*	*09/96*
Network Engineer (2)	*03/96*	*09/96*
User Interface Systems Programmer (2)	*03/96*	*09/96*
1.2 Contract for Expertise	*03/96*	*09/96*
Database Expert (1)	*03/96*	*09/96*
Network Expert (1)	*03/96*	*09/96*

DATA ACCESS & DISSEMINATION SYSTEM		
ACTIVITIES AND MILESTONES for PHASE #1 PROTOTYPE:	*START*	*FINISH*
User Interface Expert (1)	*03/96*	*09/96*
2. Systems Design & Development	*10/95*	*09/96*
2.1 Design System Architecture	*11/95*	*03/96*
2.2 Develop Database Engine	*12/95*	*06/96*
2.2.1 Research Technology	*12/95*	*04/96*
2.2.2 Design & Code Database Engine	*05/96*	*06/96*
2.2.3 Test Database Engine	*05/96*	*07/96*
2.3 Develop Distributed Computing Tools	*12/95*	*07/96*
2.3.1 Research Technology	*12/95*	*04/96*
2.3.2 Design Network	*01/96*	*03/96*
2.3.3 Build Network	*03/96*	*05/96*
2.3.4 Test Network	*04/96*	*07/96*
2.4 Develop User Interface	*12/95*	*07/96*
2.4.1 Research Technology	*12/95*	*04/96*
2.4.2 Design & Code Interface	*05/96*	*06/96*
2.4.3 Test User Interface	*05/96*	*07/96*
2.5 Integration & Testing	*08/96*	*09/96*
2.5.1 Database Engine	*08/96*	*09/96*
2.5.2 Distributed Computing Network	*08/96*	*09/96*
2.5.3 User Interface	*08/96*	*09/96*
3. Prototype (Phase 1) Implementation	*05/96*	*01/97*
3.1 Identify Beta-test Users	*05/96*	*08/96*
3.2 Assemble Prototype	*08/96*	*09/96*
3.3 Test Prototype	*08/96*	*10/96*
3.4 Set User Access to Prototype	*10/96*	*10/96*
3.5 Train Users	*10/96*	*10/96*
3.6 Roll Out Prototype	*11/96*	*11/96*
3.7 Obtain User Feedback	*11/96*	*01/97*